BS EN1898 Flexible Intermediate Bulk Containers (FIBCs) for Non-Dangerous Goods â€“ Testing Equipment

Description

5 Performance
5.1 Type-testing
All FIBC types shall be subjected to the tests as follows:
a) cyclic top lift;
b) compression/stacking test.
At least three specimens of each FIBC type shall be submitted for testing leading to certification. The specimens shall tested as follows:
Specimen 1: cyclic top lift test using the FIBC having the shortest vertical dimension;
Specimen 2: cyclic top lift test using the FIBC having the greatest vertical dimension;
Specimen 3: compression test using the FIBC having the greatest vertical dimension.
To comply with this standard the three specimens shall withstand the tests.
When the FIBC type has only one fixed vertical dimension, only Specimens 1 and 3 need be submitted, and tested to withstand the tests.
One tested sample shall be durably identified and retained for reference in any later complaint or arbitration.
The tests shall be carried out in a laboratory working under the operational provisions of EN 45001, EN 45002 and EN 45003.

5.2 Preparation of FIBC for test
5.2.1 Filling
For both the top lift and compression/stacking test, the FIBC shall be filled to the level specified in accordance with 4.3 by the manufacturer/supplier with a tolerance of 0 % and +5 % of that height. The FIBC shall be filled with either:
a) a material, e.g. plastics granules, having the following mechanical properties:
bulk density, 500 kg/m3
to 900 kg/m3;
mesh size, 3 mm to 12 mm;
angle of repose, 30Â° to 35Â°;
or:

b) the actual contents to be carried, when these are known, and where their use will not itself be a hazard.
NOTE When option b) is chosen, the FIBC type is certified in relation to that specific product only.

5.2.2 Conditioning
The filled FIBC shall be conditioned before testing at ambient temperature and relative humidity. However,
in the event of dispute, testing shall be carried out after conditioning under standard conditions of (23 Â± 2) Â°C and (50 Â± 5) % relative humidity.

5.3 Test requirements
5.3.1 Cyclic top lift test(s)
Cyclic top lift test(s) shall be carried out in accordance with annex B and the following criteria shall apply:
a) no breakage of any lifting devices to the extent that any of the lifting devices ceases to support its load;
and
b) when tested with an inner liner, no protrusion of the latter beyond the outer surface of the FIBC, except
through the closure(s), where this is a design feature; and
c) no loss of contents; and
d) no deterioration of the body which renders the FIBC unsafe for transport or storage.
NOTE A slight discharge during the test, e.g. from closures or stitch holes, should not be considered to be a failure of the FIBC, provided that no further leakage occurs after the FIBC has been raised clear of the ground.
5.3.2 Compression/stacking test
The compression/stack test shall be carried out in accordance with annex C and the following criteria shall
apply:
a) no loss of contents; and
b) no deterioration of the body which renders the FIBC unsafe for transport or storage.
NOTE A slight discharge during the test, e.g. from closures or stitch holes, should not be considered to be a failure of the FIBC, provided that no further leakage occurs after the FIBC has been raised clear of the ground.

Annex A
(normative)
UV resistance test
A.1 General
Materials often undergo rapid photochemical degradation under the influence of sunlight, unless they have been stabilized in a durable fashion. An accelerated ageing that simulates ageing caused by sunlight may be brought about by irradiation with light of a UV type. Samples cut from the load bearing materials of the FIBC, e.g. fabric, webbing, rope, sewing thread, glues, are subjected for a certain period of time to irradiation from a light source of the UV type with specified spectral distribution. A number of factors of uncertainty are inherent in the procedure, so comparisons should be available between the method used and exposures in the environment in which the product is to be used.

NOTE 1 Certain types of UV stabilizing additives are rapidly leached out, especially in an alkaline environment, which should be taken into consideration in applicable situations.
NOTE 2 The performance of UV stabilizing additives may be affected by colour and the type of pigment used. Therefore, each combination of UV stabilizing additive and pigment should be tested separately.
A.2 Principle
Test specimens are alternately exposed to UV light alone and to condensation alone in a repetitive cycle.
A.3 Apparatus
The apparatus should be in accordance with ASTM G154-98 [1] using a UV-B lamp.
A.4 Procedure
Expose a test specimen to a fluorescent UV lamp for at least 200 h using a test cycle of 8 h at 60 Â°C with UV radiation alternating with 4 h at 50 Â°C with condensation.
After exposure is complete, test the specimen for breaking force and elongation at break in accordance with ISO 5081 using the conditioning requirements as described in 5.2.2. Compare the values with results
performed on simultaneously cut test specimens that have been stored under dark and cool conditions.
A.5 Expression of results
Express the results for breaking force in Newtonâ€™s on test specimens tested before and after exposure to the UV radiation.

Annex B
(normative)
Cyclic top lift test
B.1 Principle
The filled FIBC is suspended by its lifting devices with a flat pressure plate positioned on top of the contents.
This is done in one of two alternative ways:
a) the pressure plate is restrained either from above or below. The FIBC is suspended from a frame to which an upward force is applied progressively against the resistance of the pressure plate; or
b) the FIBC is suspended from a frame fixed at the time of test then a downward force is applied progressively to the pressure plate.
The filled FIBC is subjected to a repeated loading, unloading, and dwell cycle. The force is recorded and the FIBC is observed for breakage of any lifting device, other damage, or leakage of contents.
B.2 Apparatus
B.2.1 The pressure plate shall be flat except that flanges may be fitted to its underside to prevent lateral displacement. The plate shall be of such a size that it covers between 60 % and 80 % of the surface area of the contents.
B.2.2 The suspension frame shall be such that, during the test, the filled FIBC can be suspended clear of
the ground with its lifting devices positioned as recommended by the manufacturer. For FIBCs designed for four point lifting, the suspension frame shall have the cross section shown in Figure B.1. For FIBCs designed for single point lifting, the suspension frame shall have the cross section shown in Figure B.2. For FIBCs designed for two point lifting, the suspension frame shall have the cross section shown in Figure B.1 or B.2.
B.2.3 The means of applying the force (upward or downward) shall be:

a) capable of at least the required test load;
b) capable of a rate of (70 Â± 20) kN/min;
c) fitted with a means of registering the applied force.
B.2.4 The suspension frame, the pressure plate (and any restraint used for the latter) shall be capable of
resisting the forces applied during the test with minimal deformation.
B.2.5 Apparatus for use when an upward force is applied.
B.2.5.1 Apparatus of the appropriate type illustrated in one of Figures B.3 to B.9 shall be used for FIBCs
being subjected to top lift testing using top or base restraint and an upward force as in B.1 a).
Figure B.3 Perspective view of an FIBC with four lifting devices using top restraint.
Figure B.4 Elevation of an FIBC with two lifting devices using top restraint.
Figure B.5 Elevation of an FIBC with the lifting devices formed by extensions of the body and using top restraint.

Figure B.6 Elevation of a single-point lift FIBC with base restraint using one member restraining the pressure plate.
Figure B.7 Similar to Figure B.6 but with two members restraining the pressure plate.
Figure B.8 Elevation of an FIBC with two lifting devices using base restraint and one member restraining
the pressure plate.
Figure B.9 As Figure B.8 but with two members restraining the pressure plate.
B.2.5.2 Use of the apparatus illustrated in Figures B.6 to B.9 with base restraint involves connections passing through the body of the FIBC and its test contents. Rods are a suitable method of making such connections. Considerable care shall be taken:
a) with woven fabrics that the threads shall be separated rather than be cut to permit passage of a rod;
b) to ensure that any rod passes through the base no closer than 20 mm to any base seams or joins. When, as with an FIBC having a seam or join running across the centre of the base, a single rod would need to pass within 20 mm of a seam or join then two rods should be used as shown in Figures B.7 and B.9.

NOTE It is recommended that:
a) a conical adaptor be screwed to the top of any restraining rod and removed once the FIBC is in position for test;
b) nuts be used to connect the rod(s) to the pressure plate and to a restraint.
B.2.6 Apparatus for use when a downward force is used.
Apparatus of the type illustrated in Figure B.10 shall be used for FIBCs being subjected to top lift testing using a downward force as in B.1 b).

B.3 Procedure
B.3.1 Select, fill and condition each FIBC for cyclic top lift testing in accordance with 5.1, 5.2 and 5.3.
NOTE Any top panel not designed to contribute to the overall strength of the FIBC may be removed to allow the entry of the test apparatus. The area removed should be the minimum commensurate with efficient operation of the test apparatus.
B.3.2 Select any appropriate size of pressure plate in accordance with B.2.1 and position it above the contents. This size shall be sufficiently small, and the positioning such, so that there will be no contact

between the edge of the plate and the material of the FIBC during the test.

B.3.3 Apply upwards or downwards force as appropriate. Increase the force at the rate of (70 Â± 20) kN/minute until the total force equivalent to the specified test load is registered. Remove the applied force.
Allow a dwell period of not more than 30 seconds before repeating the cycle. Repeat the test cycle until the specified number of cycles has been completed. Carry out a further test cycle to the appropriate load
specified for the final test cycle.
Use the appropriate cycle from the following:
Heavy-duty reusable FIBC types: 70 cycles at a test load of 6 x SWL and a final cycle at a test load of 8 x SWL.
Standard duty reusable FIBC types: 70 cycles at a test load of 4 x SWL and a final cycle at a test load of 6 x SWL.
Single-trip FIBC types: 30 cycles at a test load of 2 x SWL and a final cycle at a test load of 5 x SWL.
NOTE After this test is complete, further loading may be applied until failure of the FIBC, to provide additional information. When this is done, the load at failure should, together with other relevant test observations be recorded in a test report. There is no requirement, however, for the load at failure, if it is greater than the specified test load, to be noted in the certificate or reflected in the marking of the FIBC.

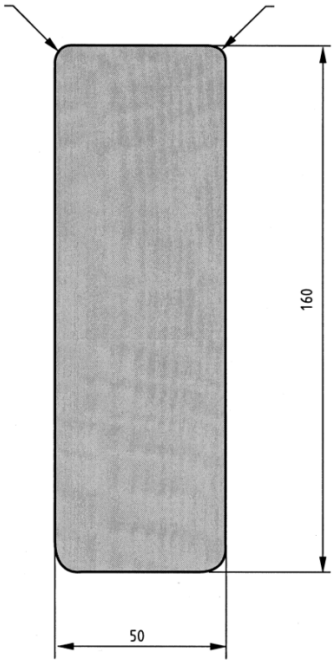


Figure B.1 — Cross section of suspension frame, Top lift test, FIBCs for four and. two point lifting

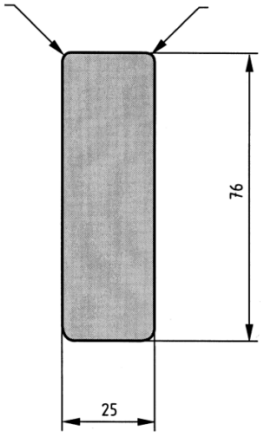
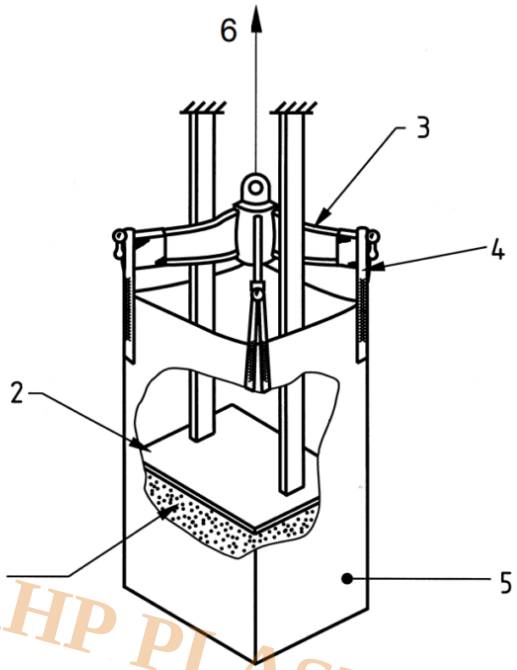


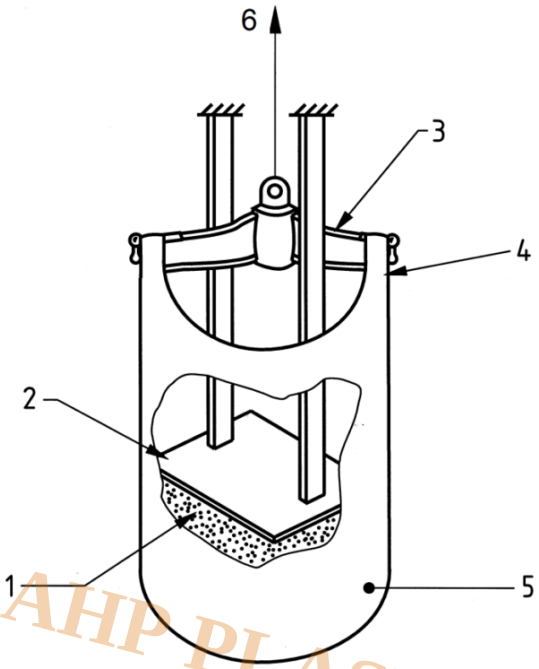
Figure B.2 — Cross section of suspension frame, Top lift test, FIBCs for single and. two point lifting



Key

1 Filler material
2 Pressure plate
3 Suspension frame
4 FIBC lifting device
5 FIBC
6 Hoisting device

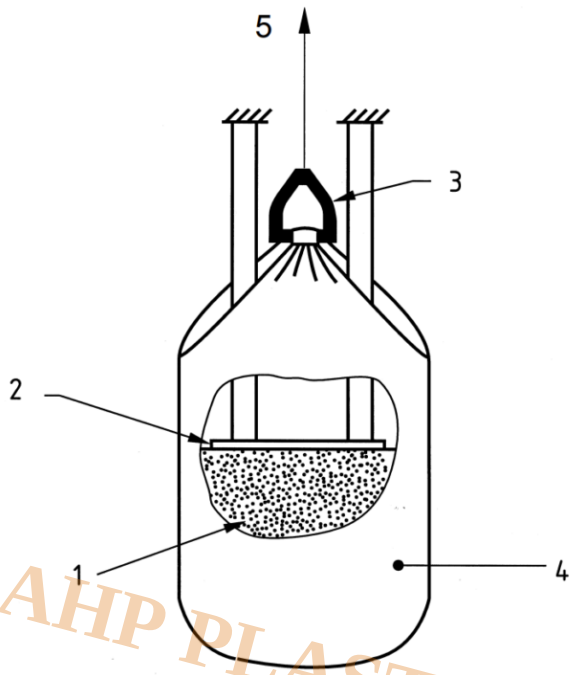
Figure B.3 — Perspective view of an FIBC with four lifting devices being tested using top restraint



Key

1 Filler material
2 Pressure plate
3 Suspension frame
4 FIBC lifting device
5 FIBC
6 Hoisting device

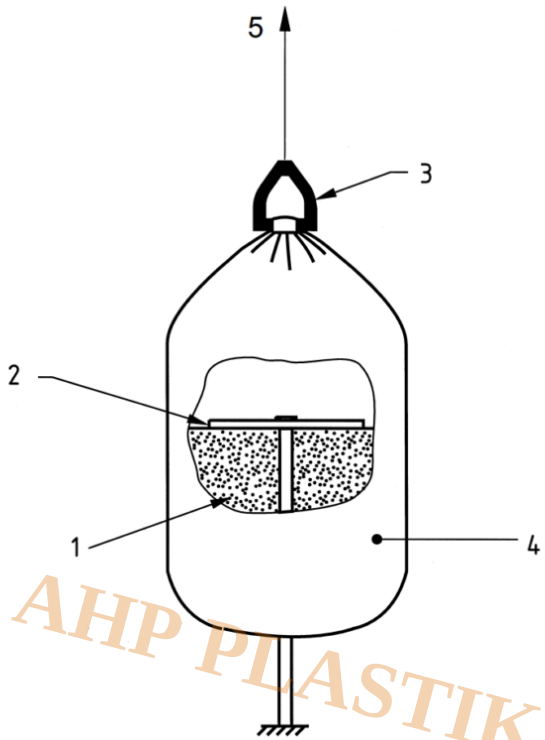
Figure B.4 — Elevation of an FIBC (with cut-out) with two lifting devices using top restraint



Key

1 Filler material
2 Pressure plate
3 Suspension frame
4 FIBC
5 Hoisting device

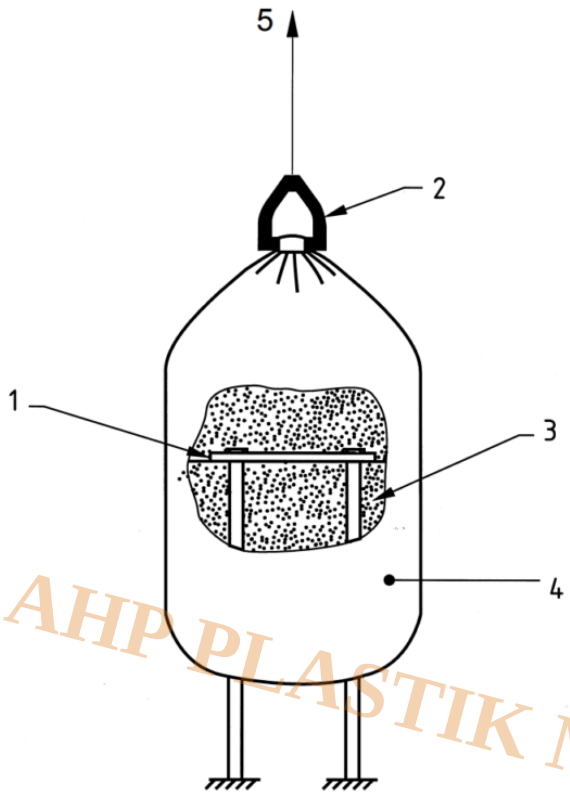
Figure B.5 — Elevation of an FIBC with the lifting devices formed by extensions of the body and using top restraint



Key

1 Filler material
2 Pressure plate
3 Suspension frame
4 FIBC
5 Hoisting device

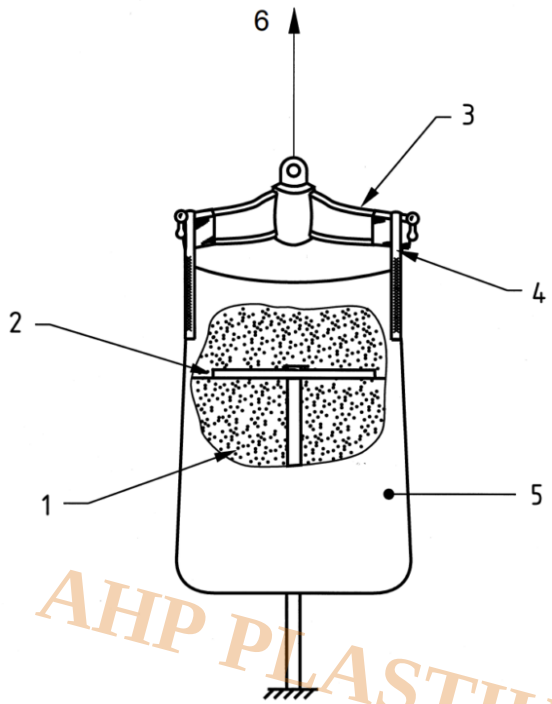
Figure B.6 — Elevation of a single-point lift FIBC with base restraint using one member restraining the pressure plate



Key

1 Pressure plate
2 Suspension frame
3 Filler material
4 FIBC
5 Hoisting device

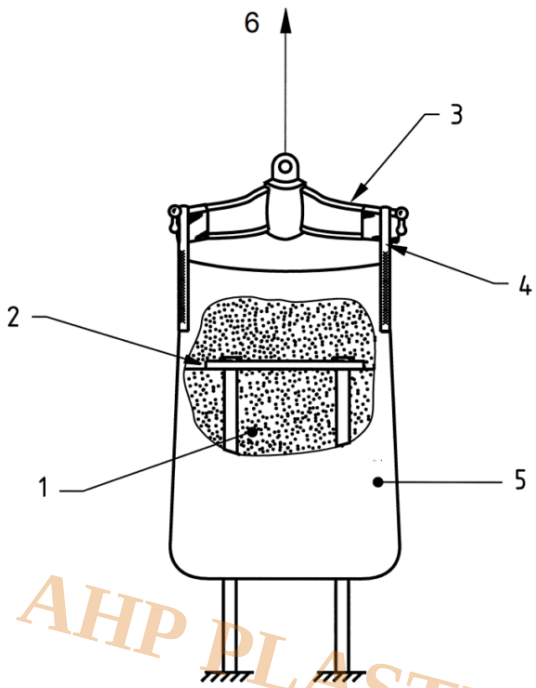
Figure B.7 — Similar to Figure B.6 but with two members restraining the pressure plate



Key

1 Filler material
2 Pressure plate
3 Suspension frame
4 FIBC lifting device
5 FIBC
6 Hoisting device

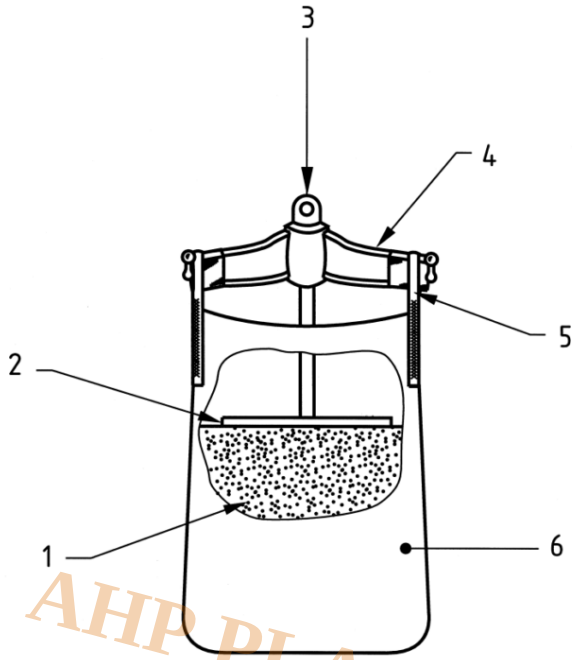
Figure B.8 — Elevation of an FIBC with two lifting devices using base restraint and one member restraining the pressure plate



Key

1 Filler material
2 Pressure plate
3 Suspension frame
4 FIBC lifting device
5 FIBC
6 Hoisting device

Figure B.9 — As Figure B.8 but with two members restraining the pressure plate



Key

1 Filler material
2 Pressure plate
3 Download force
4 Suspension frame
5 FIBC lifting device
6 FIBC

Figure B.10 — Elevation of an FIBC with two lifting devices being top lift tested using a downward force

Annex C
(normative)
Compression/stacking test

C.1 Principle

The filled FIBC is loaded to the specified test load using either a compression tester or a dead load and, at
the end of the test period, is checked for loss of contents and for deterioration of the body which renders the FIBC unsafe for transport and storage.

C.2 Apparatus Apparatus described in ISO 2872 or ISO 2874 or a flat plate with the appropriate dead load.

C.3 Procedure

Fill and condition the FIBC under test in accordance with 5.2.1 and 5.2.2. Use the method described in ISO 2872 or ISO 2874, as appropriate, or apply the load by appropriate weights loaded to a flat plate placed on top of the FIBC.

C.4 Calculation of the load to be applied

The load to be placed on the FIBC shall be 4 times its SWL. The compression load of 4 times SWL shall not
be taken as the allowable stacking load in service. Other factors that affect stacking are the actual contents used in service, FIBC dimensions and design, stacking method etc.

C.5 Duration of the test

The duration of loading shall be 6 hours.
C.6 Expression of results
Express the results of the test including whether loss of contents or deterioration of the body of the FIBC
occurred.

Big Bag (Jumbo Bag) Test Rig

- Including test control panel
- Hydraulic force application system
- 200 KN force capacity (4*50KN Loadcel)
- Hopper for sample bottom
- Filling system for sample piece
- Software is included
- Reporting in MS WORD
- Computer is included
- Hoppers for material reservoir will be as per customer request
- 7/24 online support

Universal Tensile Tester

UV Test Chamber

Category

1. Equipment for Standards
2. Standards